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*"To the solid ground
Of Nature trusts the mind which builds for aye."*—WORDSWORTH

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TWO BEE BOOKS

A Collection of Papers on Bee-keeping in India. Published under the Orders of the Government of India, in the Revenue and Agricultural Department, 1883. (Calcutta: Office of the Superintendent of Government Printing, India, 1883.)

The Honey-Bee: its Nature, Homes, and Products. By W. H. Harris, B.A., B.Sc. With Eighty-two Illustrations. (London: The Religious Tract Society, 1884.)

THE thin folio issued by the Indian Government is very redolent of red-tape, since it contains not only a large number of reports from forest and district officers, and other persons in various parts of India, but also the whole of the official correspondence, memoranda, and indorsements connected with the same. Moreover, it is almost a misnomer to call it a collection of papers on "Bee-keeping," since at least nine-tenths of the reports state that domesticated bees are quite unknown in their districts; and the bulk of the matter (nearly a hundred pages of close print) is occupied with accounts of native methods of taking the combs of wild bees and preparing the wax, and with very imperfect descriptions of the various kinds of honey-producing bees in each district. The general result of the inquiry, as stated in a "Resolution" of the Revenue and Agricultural Department, is the following:—

"The industry is unlikely ever to be one of great importance in India. It can only be followed in the hills, where flowers abound throughout the greater part of the year, or in forests, where food is equally plentiful. In the populous country of the plains, bee-keeping as a general industry seems impracticable. Under these circumstances there is little or no call for action on the part of the Government."

Notwithstanding this somewhat depressing outcome of a laborious inquiry, some interesting details may be found in the storehouse of facts here brought together. At the commencement of the Report attention is drawn to Moorcroft's account of bee-keeping in Cashmere:—

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"Their domestication there is so general that in some parts of the country a provision is made for hiving them in every house as it is being built. Spaces are left empty in the walls about 14 inches in diameter, and 2 feet, the average thickness of the walls, in length, which are carefully lined with a mixture of mortar, clay, and chopped straw, and closed at the inner end with a flat tile. There are ten or a dozen of these hives built into the walls of every house. The bees are hived exactly as in Europe, but the comb is gathered differently and in a way well worth following at home. It is done by the father of the house removing the flat tile, and at the same time blowing the smoke of a smouldering wisp of straw he holds in the other hand vigorously through the hive, on which the bees at once leave the hive, and he gathers in their store of honey. He then replaces the flat tile at the inner end of the hive, and the bees, after recovering their stupefaction, gradually return to it. The same colony of bees thus produce honey year after year in the same hive, and generation after generation, and have probably done so from the original Aryan settlement of the Cashmere Valley. In consequence of their being thus literally domiciliated with the human race, the bees of Cashmere are milder in their manners than those of any other country, although they have a most villainous sting when unduly provoked to use it. Their honey is as pure, and clear, and sweet, Moorcroft says, as the finest honey of Narbonne."

In a statement on bee-culture in Cashmere by a zemindar, it is said that hives are now very numerous, as they have been on the increase for several years, and the method of keeping them is very similar to that described by Moorcroft. But Mr. R. Morgan, Deputy Conservator of Forests, Madras, protests against the recommendation of smoking out the bees, as barbarous. It is, however, no doubt well suited to native wants, as hives are not required to be indefinitely increased, and there is no sale for swarms.

A very simple mode of bee-keeping is described as practised by the people of Mysore:—

"In March or April they besmear the concave part of an old earthen pot with honey-wax, make holes in the pot, take it to the jungles, and place it upside-down on a piece of wood or a slab of stone. The bees are attracted to the pot by the smell of the wax, and, when the person intending to domesticate them finds, after a trial of four or six days, that they have taken to remain in the pot, he goes to the jungle on a dark night, removes the pot after

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having covered it with a blanket, and places it either on a tree near or under the eaves of his house, or in any adjoining place. Each man keeps pots varying in number from one to four. He need not do anything beyond keeping the pots as aforesaid. They store honey between April 15 and June 15; and between the latter date and the end of July the keeper gathers it in, leaving a small portion to serve as food for the bees."

Mr. R. Morgan, Deputy Conservator of Forests, Madras, gives an interesting account of the honey-bees of the Wynaad. He says that the best honey-producing flower of Southern India is the *Strobilanthes*, of which there are numerous species, which almost all flower once in seven years, dying down entirely, and afterwards a fresh growth springing up from seed. The *Strobilanthes* is a shrubby genus of *Acanthaceæ*, mostly with blue or purple flowers, and the statement about their flowering only once in seven years is probably a popular delusion, like that of the *Aloe* flowering once in a century. The bees build their combs on the ledges of inaccessible precipices, often overhanging rivers, or on lofty horizontal limbs of the largest forest trees, and the combs are usually $3\frac{1}{2}$ to 4 feet in length and 2 feet in diameter. The natives take the honey on dark nights by means of long cane or bamboo ladders, either erected against the tree or rock or suspended from above, and they carry torches, and knives to cut away the combs. The bees are roused by the glare of the torches, but do not sting, although in the daytime they are terribly pugnacious, and many a sportsman and traveller has barely escaped with his life after disturbing them. Mr. Morgan states that he can give numerous instances of men, cattle, horses, and even fowls and pigeons being killed by these bees.

The Deputy Conservator of Forests, East Salween, describes some remarkably large combs, one of which was 7 feet long and 6 feet deep in the widest part. The bees are fond of particular trees, and he states that on one *Kanyin* tree (*Dipterocarpus alatus*) he counted no less than thirty-nine combs, some of prodigious size. The trees are here ascended by means of pegs driven in the trunk, as in Borneo, and the bees are partially stupefied by a smoke torch.

These are samples of the better kind of reports that have been obtained from hundreds of districts in India. There is a monotonous similarity in large numbers of them, and it may be doubted whether the information afforded is worth the labour and cost it has entailed.

Mr. Harris's little volume on "The Honey-Bee" affords a striking contrast to the preceding work, both in its elegant get-up and excellent illustrations, its wide range of matter, and the clearness and condensation of its style. It treats in a pleasant and well-informed manner not only of bee-keeping but of the bees themselves and all that relates to them. We have a chapter on the literature of bees, from the Egyptian monuments and the Vedas to Shakespeare, Huber, and modern writers. Each subject is treated in a separate short chapter, so that we have chapters on "The Queen Bee," "The Workers," "Wax," "Bee-bread," &c., and even one on "Mead," including its use in ancient times and Queen Elizabeth's receipt for its manufacture. Hives, the Enemies, and the Diseases of Bees are all separately treated, as well as their "Intel-

lect and Instinct," their "Relation to Flowers," and the "Superstitions connected with Bees."

From so condensed a work it is difficult to find passages suitable for extract, but the following illustration of the powers of intellect manifested by bees may be taken as a fair specimen of the author's style:—

"Again, let us revert to the manufacture of queens by the workers. If at the time of the removal or loss of the mother-bee in any way, there should be unhatched princesses in the hive, no attempt will be made to follow the course adopted in the absence of such royal progeny. In the *latter* case—that is, when there is no royal brood—there must be a distinct conception, first, of their bereavement; secondly, of the hopelessness of a sovereign appearing in the ordinary way. Then a judgment is formed of the proceedings necessary for making a queen, and action immediately follows. Not only so, but as if to secure themselves against the repetition of their calamity, they prepare not *one* queen, but *several*, so that, if the first which comes to maturity be lost, there may be others in reserve. A further act of definite judgment appears in this; for if one only were produced and lost, they would be powerless to repeat the process, as all the rest of the worker brood would, in the meantime, have advanced far beyond the stage at which its transformation would be possible. The bees then, with admirable prevision, forbear to risk all the future of their community on one hope of a queen."

In adducing the construction of the cells as a proof of pure instinct of the highest order, Mr. Harris is hardly on secure ground, since he omits to notice the researches of Mr. Darwin proving that the method of cell-building is very simple, and consists, fundamentally, in forming circular cells the size of which is determined by that of the bee's body, and gnawing away all the superfluous wax in the angles till the hexagonal form is produced. He is also hardly justified in the statement that "all these and other circumstances connected with the construction of their dwellings attest the possession of an innate faculty *needing no instruction from the elders of the hive*." The last statement (which we have italicised) is surely unprovable, and as every young bee necessarily begins work in the midst of her elders, and has done so during the countless generations of the past, it seems more probable that a considerable portion, though not perhaps the whole, of the bees' wonderful constructive power, is due to direct imitation and instruction.

On the whole, we can recommend this little book as a very comprehensive summary of what is known about bees and bee-keeping, at once attractive to the young who wish to learn something about these marvellous little creatures, and at the same time containing all the information necessary for the beginner in apiculture. The illustrations are both well chosen and beautifully executed, and the work is altogether so daintily got up as to render it especially suited for a gift to intelligent boys and girls.

A. R. W.

DR. KLEIN ON MICRO-ORGANISMS
Micro-Organisms and Disease. By E. Klein, M.D., F.R.S. (London: Macmillan and Co., 1884.)

THERE can be no doubt of the value and excellence of this little book. Dr. Klein is one of the very few men in this country who are continually working and experimenting with Bacteria and similar forms. His